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A PROFESSIONAL LIMITED LIABILITY COMPANY

ATTORNEYS AT LAW EX PARTE OR LATE FILED

THOMAS K. GUMP
DIRECT DIAL 202·776·2815

WASHINGTON, D.C.

1200 NEW HAMPSHIRE AVENUE, N.W. · SUITE 800 · WASHINGTON, D.C. 20036·6802
TELEPHONE 202·776·2000 · FACSIMILE 202·776 2222

ONE RAVINIA DRIVE · SUITE 1600
ATLANTA, GEORGIA 30346·2108
TELEPHONE 770·901·8800
FACSIMILE 770·901·8874

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

March 1, 1996

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

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Re: Ex Parte Presentation
       CC Docket No. 92-297

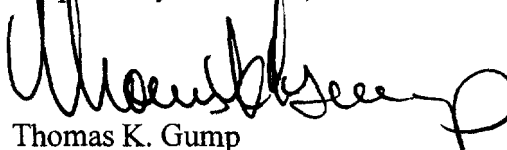Dear Mr. Caton:

Pursuant to Section 1.1206 of the Commission's rules and regulations, Lockheed Martin Corporation hereby reports that an **ex parte** presentation was made today, March 1, 1996, by Gerald Musarra, Senior Director, Space and Strategic Missiles Sector, Lockheed Martin Corporation, Raymond G. Bender, Jr., counsel to Lockheed Martin Corporation, and Dr. Richard J. Barnett, engineering consultant to Lockheed Martin Corporation, to Rudy Baca in Commissioner James Quello's s office. The discussion involved 28 GHz band plan options in connection with the above-referenced proceeding, including options described in the attached materials.

In accordance with the requirements of Section 1.1206(a) of the Commission's Rules, an original and one copy of this letter are being submitted to the Secretary's office. A copy of this letter is also being provided to Mr. Baca.

Please contact the undersigned if any questions arise in connection with this letter.

Respectfully submitted,

Thomas K. Gump
Counsel to Lockheed Martin
Corporation

cc (w/encl):   Mr. Rudolfo M. Baca

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28 GHz Band Plan

The GSO/FSS allocation must be 1,000 MHz.

Dr. Richard Barnett

TELECOMM STRATEGIES for Lockheed Martin
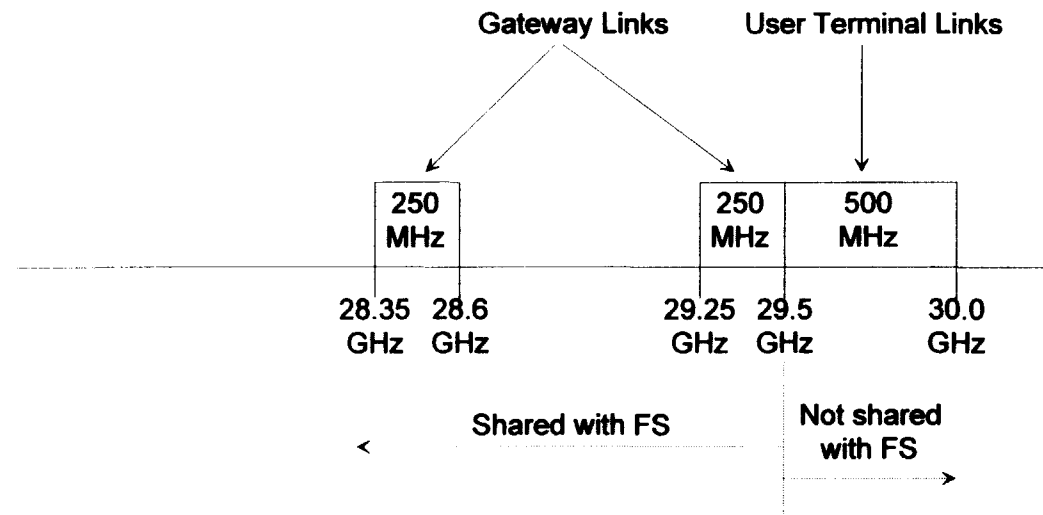
History of the 28 GHz band

- Long-standing allocation in this frequency band gave 2.5 GHz spectrum for future high capacity commercial FSS systems.

- 2 GHz of this band is shared with the FS - not considered a major problem in the past.

- Advent of LMDS as a form of FS has taken away a significant part of the FSS spectrum - LMDS has been unwilling to share with the FSS.

- Proposed GSO/FSS spectrum in options 3 and 4 has dropped below 1 GHz, which is a critical number for the GSO/FSS systems.

- GSO/FSS can only accept options 1, 2, 2A, 2B and 5 of the currently proposed options, and Lockheed Martin's **Astrolink** system can be accommodated by any of these options.

- LMDS should be prepared to accept some of the burden of option 5 which is only similar to the burdens GSO/FSS is willing to accept. Option 5 involves no loss of spectrum to LMDS or any of the parties.

- In the event of a total impasse, Lockheed Martin proposes a compromise solution (Option 4A) in lieu of options 3 and 4.

Sharing is a <u>must</u>

- ITU is actively promoting sharing to make more efficient use of the spectrum - US supports this approach (and indeed it is very much in our interests to support this principle).

- Systems can be designed to optimize sharing.

- Lockheed Martin's **Astrolink** system was designed specifically to be able to share part of the spectrum with other users.

- By contrast LMDS and Motorola are being over-conservative in their sharing analyses, which results in *band segmentation* rather than *sharing.*

- FCC should encourage, not penalize, systems that have been designed to be compatible with other users.
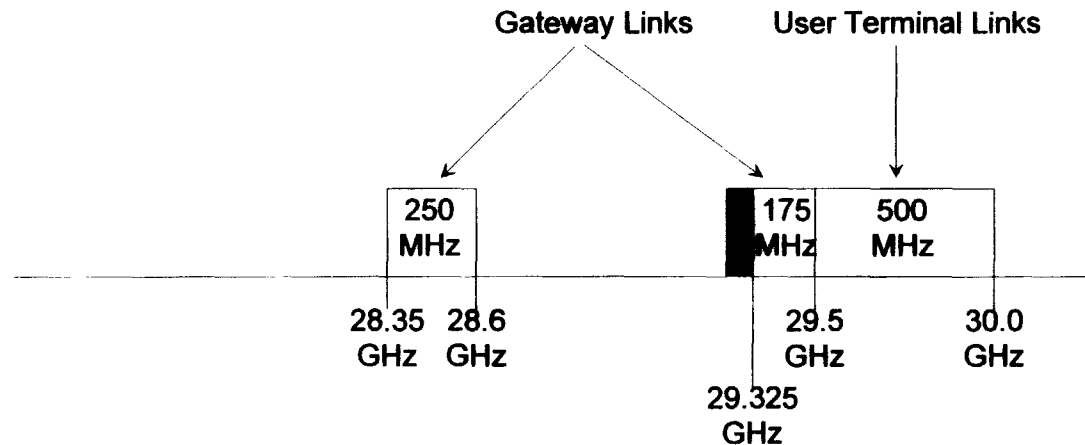
Astrolink sharing optimization

- **Astrolink** system design uses the lower two 250 MHz bands for larger gateway terminals which can share well with MSS feeder links and with LMDS:

Gateway Links   User Terminal Links

250 MHz		250 MHz	500 MHz

28.35 28.6   29.25 29.5   30.0
GHz   GHz   GHz   GHz   GHz

Shared with FS   Not shared with FS

- This design was used to facilitate sharing consistent with the FCC's proposed band plan (option 1).
- This design is also fully compatible with option 5 (and 2, 2A, 2B)

Astrolink under Option 4

- Bandwidth for gateway links drops from 500 MHz to 425 MHz (15% reduction in gateway capacity).

- Gateway uplink processor is significantly more complex as it now has to handle both 250 MHz and 175 MHz channel bandwidths. This in turn affects redundancy schemes etc.

Gateway Links   User Terminal Links

| 250 MHz | | 175 MHz | 500 MHz |

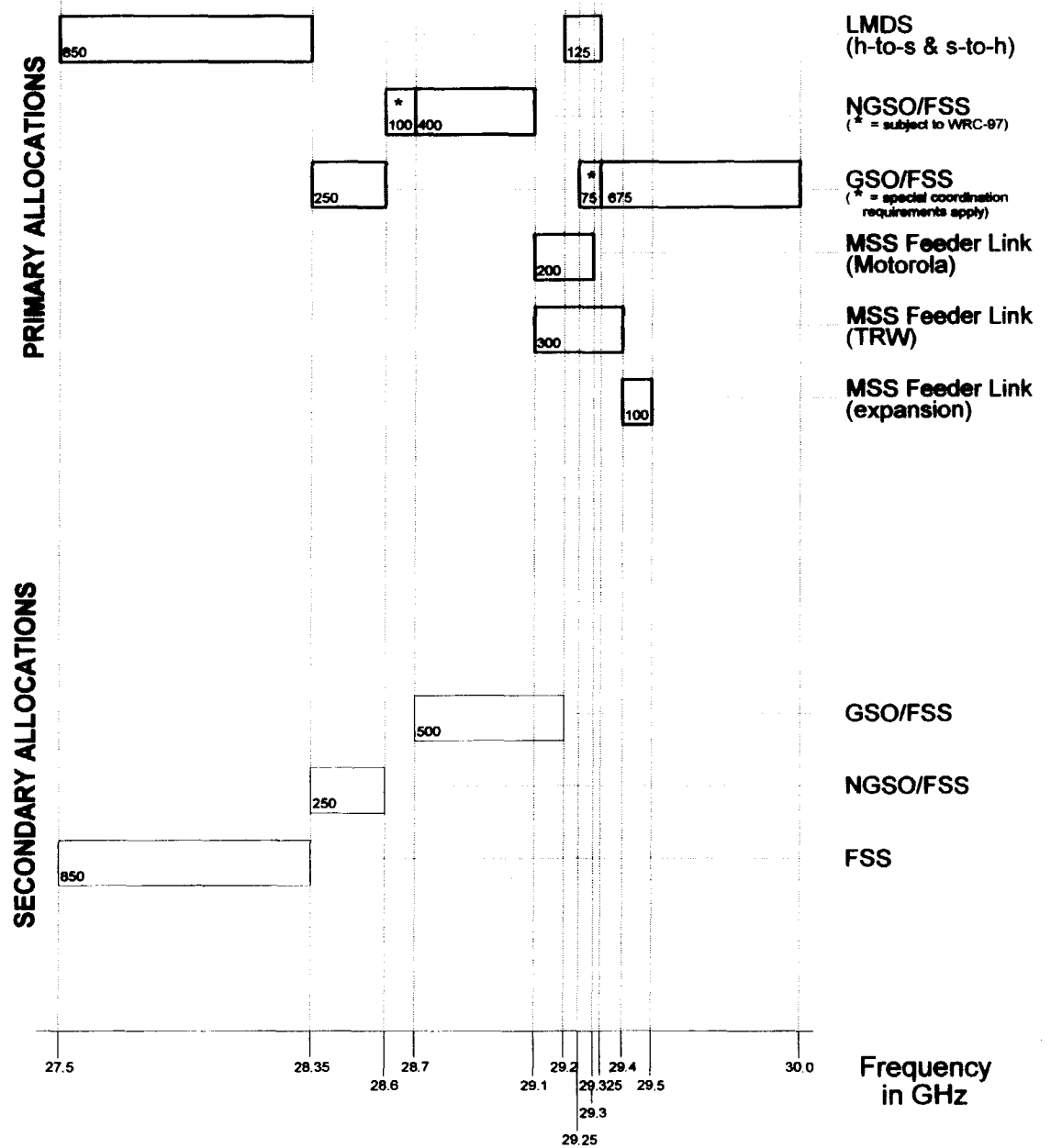28.35 GHz 28.6 GHz   29.5 GHz   30.0 GHz

29.325 GHz

- Option 4 is not acceptable as it stands (option 3 is even worse).

- Option 4 would be viewed by the rest of the world as a very parochial assignment, with a GSO/FSS allocation of less than 1,000 MHz.

Lockheed Martin Option 4A

- Create a 28 GHz Band Plan with sufficient flexibility to allow additional sharing between GSO/FSS and other services in the frequency range 29.25-29.325 GHz (i.e., 75 MHz).

- Only GSO/FSS systems that are optimized for the sharing environment would be able to coordinate and therefore gain access to this additional spectrum.

Option 4A
Band Plan

PRIMARY ALLOCATIONS

LMDS
(h-to-s & s-to-h)

NGSO/FSS
(* = subject to WRC-97)

GSO/FSS
(* = special coordination
requirements apply)

MSS Feeder Link
(Motorola)

MSS Feeder Link
(TRW)

MSS Feeder Link
(expansion)

SECONDARY ALLOCATIONS

GSO/FSS

NGSO/FSS

FSS

27.5   28.35   28.7   29.2   29.4   30.0
28.6   29.1   29.325   29.5
29.3
29.25

Frequency
in GHz

Impact of Option 4A

- GSO/FSS will coordinate with and share the 75 MHz frequency range 29.25-29.325 GHz with LMDS (h-to-s and s-to-h). Protection may be ensured by relatively simple constraints.

- GSO/FSS will coordinate with and share the 50 MHz frequency range 29.25-29.3 GHz with Motorola MSS feeder links, if Motorola elects to use that part of the band (not certain in Option 4 at present).

- GSO/FSS will increase its shared frequency range with TRW MSS feeder links from 75 MHz to 150 MHz in the frequency range 29.25-29.4 GHz.

Special Coordination in the 75 MHz

- Special coordination conditions will apply in the frequency range 29.25-29.325 GHz in order to adequately protect the LMDS and MSS interests. Constraints on the GSO/FSS may include radiation limits at low elevation angles and constraints on earth station locations.

- Gateway links on GSO/FSS will be less problematic than MSS feeder links (higher elevation, no NGSO tracking) - measures similar to those already proposed in this frequency range between LMDS and MSS feeder links will solve interference between LMDS and GSO/FSS.

- Coordination measures agreed with TRW in the frequency range 29.325-29.4 GHz will be extended to the additional frequency range.

- Coordination with Motorola may not be required if Motorola elects not to use the frequency range 29.25-29.3 GHz. If Motorola does use this frequency range then coordination will be achieved using techniques similar to those proposed with respect to TRW.

Flexible Frequency Allocations

- The Commission should make allocations as flexible as possible to allow various services to find ways to share common spectrum.

- Such allocations will become an example to the rest of the world.

- An allocation of 1,000 MHz to GSO/FSS will be better accepted internationally than a "parochial" 925 MHz.

OPTION 4A:

LMDS (h-to-s) (s-to-h) fss	GSO/FSS ngso/fss	WRC-97	NGSO/FSS gso/fss	MSS FL TRW Motorola	MSS FL TRW Motorola? LMDS (h-to-s) (s-to-h)	MSS FL TRW Motorola? LMDS (h-to-s) (s-to-h) GSO/FSS	MSS FL TRW LMDS (h-to-s) (s-to-h) GSO/FSS	MSS FL TRW GSO/FSS	MSS FL GSO/FSS	GSO/FSS
850 MHz	250 MHz	100 MHz	400 MHz	100 MHz	50 MHz	50 MHz	25 MHz	75 MHz	100 MHz	500 MHz

27.5   28.35   28.6   28.7   29.1   29.2   29.25   29.3   29.325   29.4   29.5

Notes:

1. At 29.2-29.325 GHz LMDS and MSS feeder links sharing using TI's proposed rules.
2. Motorola and TRW sharing rules same as Options 2 and 3.
3. TRW and GSO/FSS sharing rules same as Options 2 - 4.
4. GSO/FSS in the band 29.25-29.325 GHz subject to special coordination constraints to protect LMDS and MSS feeder links.

Features (relative to Option 4):

- Increases primary frequency allocation for GSO/FSS from 925 MHz to 1,000 MHz.
- Increases bandwidth shared between GSO/FSS and TRW from 75 MHz to 150 MHz. Sharing with TRW will be as for Option 4.
- No additional sharing with Motorola if Motorola uses 150 MHz or less. If Motorola uses 200 MHz then there will be 50 MHz bandwidth shared between GSO/FSS and Motorola. Sharing with Motorola will be based upon similar measures as those proposed between GSO/FSS and TRW in Option 4.
- Sharing with LMDS in the frequency range 29.25-29.325 GHz will be achieved by locating and/or shielding GSO/FSS transmitting earth stations so that they do not interfere with LMDS receivers. Detailed coordination will be required to determine suitable locations and technical parameters.